

REMARKS

Claims 23 through 30 are currently pending in the application.

This amendment is in response to the Office Action of April 20, 2004.

35 U.S.C. § 112 Claim Rejections

Claims 23 and 24 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses this rejection, as hereinafter set forth.

Applicant asserts that as presently amended. Claims 23 and 24 clearly comply with the provisions of 35 U.S.C. § 112, first paragraph, as such claims clearly set forth that “an impurity offset from the apex of the at least one protuberance formed from a portion of said generally planar surface and within said protuberance, said impurity within said protuberance having has a concentration decreasing concurrently with a distance from the apex substantially formed from a portion ~~upper surface~~ of said generally planar surface” which is clearly supported by paragraphs [0028] through [0039] of the specification. Therefore, claims 23 and 24 are allowable.

Claims 25 and 27 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicant has amended the claimed invention as suggested by the Examiner in the Office Action for the presently claimed invention to particularly point out and distinctly claim the subject matter of the invention to comply with the provisions of 35 U.S.C. § 112, second paragraph. Therefore, presently amended claims 25 and 27 are allowable.

Claim Objections

Claims 25 and 27 are objected to due to informalities in the claim language. Appropriate correction has been made.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on Bol (U.S. Patent 5,269,877)

Claims 25 through 30 are rejected under 35 U.S.C. § 102(b) as being anticipated by Bol (U.S. Patent 5,269,877).

Applicant asserts that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Verdegaal Brothers v. Union Oil Co. of California, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Turning to the cited prior art, Bol discloses a process for making tip structures in conical or other shapes. (Col. 1, lines 44-45). The tip structures are produced on a substrate 10. Silicon is convenient but not necessary for the process. A 1.5-2.0 micron layer of amorphous silicon or polysilicon 12 with a surface 11 is deposited on substrate 10. (Col. 3, lines 15-19, FIG. 1). The amorphous silicon or polysilicon has a dopant concentration that is greatest at surface 11 and least at the interface between the amorphous silicon or polysilicon 12 and the substrate 10. (Col. 3, lines 20-25). Next, a nitride layer 16, 0.3-0.4 microns thick is deposited on the amorphous silicon or polysilicon 12. (Col. 3, lines 30-32). The next step is to pattern the nitride layer 16 and the amorphous silicon or polysilicon 12. This is done using a conventional photoresist process. (FIG. 4, Col. 3, lines 37-39). After etching, the amorphous silicon or polysilicon 12 has tapered sidewalls due to the higher dopant concentration, which speeds up the etching process. (FIG. 5, Col. 3, lines 42-45). The amorphous silicon or polysilicon 12 is next oxidized to grow oxide bumpers 20. (FIG. 6). Fastest growth of oxide bumpers occurs at areas of highest dopant concentration. (Col. 3, lines 47-48, 53-55). Thus, oxide bumper 20 grows fastest and thickest near surface 11 of the amorphous silicon or polysilicon 12. Nitride layer 16 contributes to the final shape of oxide bumper 20. Because oxygen does not diffuse through the nitride layer 16, no oxide is grown on nitride layer 16. (Col. 3, lines 57-63). Fastest oxidation occurs just below interface 13 and decreases with decreasing dopant concentration. (FIG. 6, Col. 4, lines 4-6). The tip structure 22 includes base 24 and point 26. This tip structure 22 is formed as oxide bumper 20 grows. (Col. 4, lines 7-9). The final process step is removal of the oxide and nitride layers,

leaving tip structure 22. Conventional process steps are used to remove the oxide and nitride layers. (Col. 4, lines 15-18).

After carefully considering the cited prior art, the rejections, and the Examiner's comments, Applicant has amended the claimed invention to clearly distinguish over the cited prior art.

Applicant asserts that the presently claimed inventions of presently amended independent claims 25 and 27 are not anticipated under 35 U.S.C. § by the Bol reference because the Bol reference does not identically describe each and every element of the presently claimed inventions in as complete detail as is contained in the claims. For instance, Applicant asserts that the Bol reference does not describe the elements of the presently claimed inventions of presently amended independent claims 25 and 37 calling for "a remaining portion of a single-layered substrate, the remaining portion being an uncontaminated single-layered substrate that is at least semiconductive formed from a single-layered substrate having an upper surface, the single-layered substrate having an impurity concentration greatest at the upper surface while decreasing with a distance from the upper surface", "a micro-cathode located in a portion of ~~on~~ said substrate formed from the portion of the single-layered substrate having an impurity concentration greatest at the upper surface thereof . . . further comprising . . . a contaminated apex having an impurity concentration substantially the same as a portion of the single-layered substrate at the upper surface thereof; and a decreasingly contaminated body, the concentration of the impurity decreasing from the contaminated apex", "a substrate comprising semiconductive material formed from a single-layered substrate having an upper surface, the single-layered substrate having an impurity concentration greatest at the upper surface while decreasing with a distance from the upper surface", and "an emitter electrode located in a portion of said substrate, further comprising an apex having an impurity concentration substantially the same as a portion of the single-layered substrate at the upper surface thereof, and further having an etch-resistible quality that increases with depth from said apex".

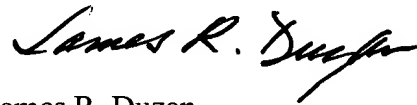
In contrast to the presently claimed inventions of presently amended independent claims 25 and 27, the Bol reference uses a multilayer substrate, not a single layer substrate. Such is not the presently claimed inventions of presently amended independent claims 25 and 27. Therefore,

presently amended independent claims 25 and 27 as well as dependent claims 26 and 28 through 30 therefrom are allowable.

In summary, Applicant submits that claims 25 through 30 are clearly allowable over the cited prior art.

Applicant requests the allowance of claims 23 through 30 and the case passed for issue.

Respectfully submitted,



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